



Restoring Cheatgrass-Invaded Sites

The Question: Can the succession-based “ecological bridge” approach restore natural communities invaded by cheatgrass (*Bromus tectorum*)?

Cheatgrass, an exotic annual grass, is expanding its range to higher elevations in Rocky Mountain National Park (RMNP), transforming habitats and reducing native species diversity in the areas it has invaded. Because of its sharp awns that prick delicate mouth parts, wildlife will not eat this grass. The early annual growth of cheatgrass allows it to gain a competitive advantage over slower-growing native perennial species, resulting over time in monocultures of this unpalatable grass. In addition cheatgrass is very flammable and can alter natural fire regimes.

The park is dedicated to preserving native plant communities. Thus the park is interested in techniques to restore cheatgrass-invaded areas. The “ecological bridge” is a restoration technique that uses hardy, early-successional plant species to compete against the invasive plant and allow native perennial communities to establish. In order to control cheatgrass and restore invaded sites to conserve biological diversity and ecosystem functioning, researchers Helen Rowe and Cynthia Brown at Colorado State University’s Department of Bioagricultural Sciences and Pest Management tested the “ecological bridge” during 2003-2005.



Researcher Rowe analyzes cheatgrass communities in plots.

The Project: Evaluate the effects of succession-based seed mixtures on the establishment of late successional species and their ability to deter cheatgrass invasion.

The experiment was located at an elevation of 7800 feet, where cheatgrass invasion was patchy to highly dominant. The park planted (broadcast seeding with raking) a combined early- and late-successional species mixture collected from native plants nearby. An adjoining area was planted with an early-successional mixture the first year followed by a late-successional mixture in the second year. The early-successional seed mix was composed of shorter-lived perennials and annuals but no shrubs. The late-successional seed mix included long-lived perennials such as fringed sage and rabbitbrush (*Chrysothamnus viscidiflorus*). The scientists then analyzed the plant cover and richness of existing species in the community by functional group.



Cheatgrass: An unwelcomed guest.

The Results: Seeding treatments did not result in a community with diminished cheatgrass and increased perennial cover.

Results indicated that none of the seeding treatments suppressed cheatgrass or increased perennial plant cover. While early-successional and late-successional species in the study successfully established from the respective seed mixtures, none of the treatments created a community that could resist cheatgrass. The researchers discovered that early-successional native species could not act as a bridge in this study, given the time frame of the experiment. It is possible, however, that the success of native species as an “ecological bridge” requires a longer time period. On the other hand, with such a vigorous competitor as cheatgrass, it is likely that plant species with rapid growth rates might be required to form an effective “ecological bridge.”